DaimlerChrysler AG

Patent claims

1. A method for operating a four-stroke internal combustion engine, having the following features:
   - fuel is injected directly into at least one combustion chamber of the internal combustion engine, the volume of which changes cyclically,
   - fresh gas is supplied through at least one intake valve and combustion exhaust gas is discharged through at least one exhaust valve,
   - at part-load, a lean base mix of air, fuel and retained exhaust gas is formed, and at full load a stoichiometric mix is formed,
   - compression ignition takes place at part-load and spark ignition takes place at full load,
   - the fuel quantity is provided in the form of a preinjection and a main injection,

   characterized in that the fuel which is provided in the preinjection is injected into the intermediate compression stroke of the internal combustion engine, while the main injection takes place synchronously with the induction.

2. The method as claimed in claim 1, characterized in that the mass ratio of the fuel mass injected in the preinjection and the fuel mass injected in the main injection is divided according to the operating state of the internal combustion engine.

3. The method as claimed in claim 2, characterized in that a valve closure overlap between the intake valves and the exhaust valves is invariable during the load change.

4. The method as claimed in one of claims 1 to 3, characterized in that the division of the injected fuel

masses into preinjection and main injection is approximately 50:50.

5. Method as claimed in one of claims 1 to 4, characterized in that the injection point of the preinjection is dependent on the engine speed and the injection pressure.